the 19th and 24th. The British steamship *State of Georgia* met field ice on the 13th in N. 48° 22′, W. 48° 48′, but did not clear it for five days, her progress being greatly impeded, and the plates of the vessel damaged. On the 17th the British bark *Armenia* collided with an iceberg in N. 44°, W. 48°; no report of the damage.

TEMPERATURE OF THE AIR.

[*In degrees Fahrenheit.*]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

NORMAL TEMPERATURE.

In Table II, for voluntary observers, the mean temperature is given for each station, but in Table I, for the regular stations of the Weather Bureau, both the mean temperatures and the departures from the normal are given for the current month. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal; the normal for any district or station may be found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

DEPARTURES FROM NORMAL TEMPERATURE.

As compared with the normal for this month temperatures were in excess over the entire country east of the Rocky Mountains, but were deficient over the Rocky Mountain and Pacific coast region; the line of no departure extends from central Assiniboia southward through the eastern boundary of Wyoming and central Colorado to the southeastern portion of New Mexico. The maximum excess was from 10 to 12 over Lake Huron and the northern portion of Lake Michigan. The maximum deficits were: Helena, Mont., 3.2; Calgary, Alberta, 3.0; Edmonton, Alberta, 6.6; San Diego, Cal., 4.4; and Portland, Oreg., 4.5, with a rather smaller deficit at intermediate places.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for March for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for March, 1894; (4) the departure of the current month from the normal; (5) the extreme monthly means for March and the years of their occurrence during the period of observation:

State and station.	(1) Normal for the month of Mar.	(2) Length of record.	(3) Mean for Mar., 1894.	(4) Departure from normal.	(5) Extreme monthly means for March.			
					Highest.	Year.	Lowest.	Year.
Arizona.	°	*Years*	°	°	°		°	
Fort Apache	46.0	22	43.3	− 2.7	53.8	1879	41.3	1875
Fort Mohave	63.6	23	.....	.....	70.5	1879	58.0	1880
Whipple Barracks	45.4	22	41.9	− 3.5	53.8	1879	38.7	1886
Arkansas.								
Keesees Ferry	47.7	12	52.8	+ 5.1	55.4	1882	45.0	1891
California.								
Riverside	56.2	12	54.2	− 2.0	61.6	1885	51.5	1893
Colorado.								
Las Animas	40.0	12	42.9	+ 2.9	45.4	1887	33.2	1891
Florida.								
Merritts Island	66.0	12	69.7	+ 3.7	71.4	1882	61.6	1889
Georgia.								
Forsyth	56.7	20	62.8	+ 6.1	62.8	1894	51.4	1885
Idaho.								
Boise Barracks	43.0	20	41.0	− 2.0	49.1	1889	36.8	1882
Fort Sherman	38.2	10	35.0	− 3.2	43.6	1889	33.2	1882

Departures from normal temperature—Continued.

State and station.	(1) Normal for the month of Mar.	(2) Length of record.	(3) Mean for Mar., 1894.	(4) Departure from normal.	(5) Extreme monthly means for March.			
					Highest.	Year.	Lowest.	Year.
Indiana.	°	*Years*	°	°	°		°	
Lafayette	36.0	14	45.3	+ 9.3	45.3	1894	29.6	1885
Iowa.								
Cresco	25.2	22	35.7	+10.5	42.3	1878	19.6	1888
Kansas.								
Eureka Ranch	40.1	11	43.7	+ 3.6	46.6	1889	34.1	1891
Independence	44.5	22	50.6	+ 6.1	54.1	1878	36.7	1876
Louisiana.								
Grand Coteau	61.0	11	64.4	+ 3.4	66.2	1884	57.6	1892
Maine.								
Orono	27.5	23	32.5	+ 5.0	34.6	1871	19.1	1885
Maryland.								
Cumberland	37.1	23	44.9	+ 7.8	46.0	1878	30.0	1875
Michigan.								
Kalamazoo	31.3	18	41.3	+10.0	42.2	1878	22.5	1885
Missouri.								
Sedalia	41.3	11	48.8	+ 7.5	48.8	1894	36.1	1891
Montana.								
Fort Custer	32.5	12	28.4	− 4.1	40.8	1889	23.0	1888
Nebraska.								
Fort Robinson	34.0	10	36.9	+ 2.9	43.0	1889	24.8	1891
Genoa (near)	32.1	18	40.5	+ 8.4	43.6	1878	23.8	1876
Nevada.								
Browns	46.7	22	.....	.....	52.8	1879	37.7	1880
Carson City	41.3	17	40.8	− 0.5	50.1	1877	33.5	1880
New Hampshire.								
Hanover	27.8	23	35.9	+ 8.1	35.9	1894	19.0	1872, 1875
New Mexico.								
Fort Wingate	41.9	23	39.0	− 2.9	51.1	1879	34.3	1886
New York.								
Cooperstown	27.4	23	35.5	+ 8.1	37.2	1871	18.3	1885
Plattsburg Barracks	26.6	23	34.2	+ 7.6	35.0	1871	16.7	1885
North Carolina.								
Lenoir	45.5	20	52.0	+ 6.5	52.0	1894	35.0	1877
Oklahoma.								
Fort Reno	48.3	10	49.6	+ 1.3	52.8	1887	45.5	1891
Fort Sill	51.0	22	53.9	+ 2.9	59.3	1879	42.0	1876
Fort Supply	44.9	15	47.4	+ 2.5	52.6	1882	37.4	1876
Oregon.								
Bandon	46.8	10	45.5	− 1.3	50.8	1889	41.5	1886
Pennsylvania.								
Dyberry	28.6	23	37.7	+ 9.1	37.7	1894	19.5	1885
Grampian	30.5	23	39.8	+ 9.3	40.4	1878	20.1	1885
Wellsboro	30.5	14	39.4	+ 8.9	39.4	1894	22.4	1885
South Carolina.								
Statesburg	52.7	13	60.4	+ 7.7	60.4	1894	48.3	1885
South Dakota.								
Fort Sully	29.1	23	34.8	+ 5.7	44.5	1878	15.9	1876
Texas.								
Austin	60.4	22	.....	.....	66.8	1879	53.0	1872
Silver Falls	51.7	8	53.3	+ 1.6	57.6	1887	47.7	1891
Utah.								
Terrace	42.0	22	41.9	− 0.1	51.3	1889	28.3	1875
Vermont.								
Strafford	26.0	21	33.3	+ 7.3	33.8	1878	17.2	1883
Virginia.								
Dale Enterprise	41.5	14	47.2	+ 5.7	47.2	1894	32.1	1885
Washington.								
Fort Townsend	44.5	21	41.4	− 3.1	50.7	1885	38.7	1880
West Virginia.								
Parkersburg	41.7	12	47.3	+ 5.6	52.8	1882	36.7	1890
Wisconsin.								
Madison	29.3	23	38.3	+ 9.0	43.9	1878	23.2	1888
Wyoming.								
Fort Washakie	33.1	11	31.5	− 1.6	41.0	1887	26.8	1891

MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

During March, 1894, the mean temperature was highest at Key West, Fla., 73.9, but lowest among United States stations at St. Vincent, Minn., 21.7, and among Canadian stations reporting by telegraph, 10.1, at Battleford, Saskatchewan. The temperature averaged 32 in a zone passing through central

Maine, northern Vermont, northern Lake Huron, northern Michigan, north-central Wisconsin, south-central Minnesota, central South Dakota, central Wyoming, western Montana, and the eastern portion of British Columbia.

YEARS OF HIGHEST MEAN TEMPERATURE FOR MARCH.

The mean temperature for March, 1894, was the highest on record at regular Weather Bureau stations, as shown in the following table, which also gives the highest previous record:

Highest mean temperature for March.

Stations.	Mar., 1894.	Departure from normal.	Highest previous.	
			Temperature.	Year.
Eastport, Me	33·4	+ 4·8	33·4	1881
Northfield, Vt	34·0	+ 8·7	29·5	1889
Boston, Mass	42·5	+ 7·9	41·5	1871
Nantucket, Mass	39·3	+ 4·9	36·4	1889
Vineyard Haven, Mass	43·0	+ 6·8	38·6	1889
Narragansett Pier, R. I	39·4	+ 6·1	36·8	1889
Block Island, R. I	39·8	+ 4·8	37·9	1882
Albany, N. Y	39·8	+ 6·8	38·8	1882
New York, N. Y	45·4	+ 7·3	43·8	1878
Cape May, N. J	44·0	+ 6·2	43·6	1878
Cape Hatteras, N. C	55·6	+ 5·9	53·3	1884
Raleigh, N. C	56·0	+ 7·7	49·6	1890
Charlotte, N. C	56·6	+ 5·8	54·6	1879
Chattanooga, Tenn	55·6	+ 4·6	55·1	1882
Columbus, Ohio	46·2	+ 7·4	44·2	1882
Pittsburg, Pa	47·4	+ 8·1	47·3	1871
Springfield, Ill	46·6	+ 6·7	44·3	1889
Topeka, Kans	48·6	+ 9·4	44·9	1889
Columbia, Mo	45·8	+ 6·3	44·1	1889
Des Moines, Iowa	42·6	+ 7·6	42·2	1889
Green Bay, Wis	37·0	+ 11·5	34·0	1889

YEARS OF LOWEST MEAN TEMPERATURE FOR FEBRUARY.

The mean temperature for March, 1894, was the lowest on record at the following regular Weather Bureau stations: Tatoosh Island, Wash., 42.1, or 3.1 below the normal, the lowest previous being 41.0 in 1890; Fort Canby, Wash., 42.6, or 2.8 below the normal, the lowest previous being 43.8 in 1891; Astoria, Oreg., 43.5, or 3.1 below the normal, the lowest previous being 44.0 in 1886.

MAXIMUM TEMPERATURE.

The maximum temperatures at regular stations of the Weather Bureau are given in Table I, from which it appears that the highest maxima were: Abilene, Tex., 92; Yuma, Ariz., 95; Raleigh, N. C., 89; Norfolk, Va., Augusta and Savannah, Ga., and Titusville, Fla., 88. The lowest maxima were: St. Vincent, Minn., 48; Duluth, Minn., and Eastport, Me., 51.

The maximum temperatures for Arkansas, Missouri, Iowa, and South Dakota and thence eastward to the Atlantic Ocean occurred in general from the 17th to the 22d, and were the highest on record for the past twenty years. In connection with this unusually warm period a special bulletin was issued on March 23d, as follows:

The weather reports show that throughout the middle and south Atlantic States, from eastern Pennsylvania and New Jersey to South Carolina, and in northern Georgia and Alabama and eastern Tennessee, Thursday, March 22, was the warmest day, so far as the Weather Bureau has record, that has ever occurred during the month of March.

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Throughout Maryland, Virginia, and North Carolina the temperatures on Monday, March 19, also rose higher than during any previous March.

* * * * * * * * *

The records throughout the eastern portion of the United States indicate generally that the present month has been an unusually warm one.

At Washington, D. C., up to and including March 22, there has been an excess of temperature over the normal for the month of 268°, or an average of over 12° a day. Last year at the same date there was a deficiency of 10° for the month, or an average of about one-half a degree a day.

MINIMUM TEMPERATURE.

The lowest temperatures recorded at regular stations of the Weather Bureau are given in Table I, from which it appears that the lowest minima were: Havre, Mont., —17; St. Vincent, Minn., —12; Moorhead, Minn., —11; Bismarck, N. Dak., —10. The highest minima were: Key West, Fla., 61; Jupiter, Fla., 45; Tampa, Fla., 39; Galveston and Corpus Christi, Tex., and Titusville, Fla., 38.

DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each of the regular Weather Bureau stations in Table I, from which the following are selected:

Greatest daily ranges.—Pueblo, Colo., 51; North Platte, Nebr., 50; Denver, Colo., and Havre, Mont., 49; Rapid City, S. Dak., and Valentine, Nebr., 48; Columbia, Mo., and Huron, S. Dak., 47; Colorado Springs, Colo., 46; Dodge City, Kans., 45.

Smallest daily ranges.—Key West, Fla., and Tatoosh Island, Wash., 13; Nantucket, Mass., 16; Woods Holl, Mass., 17; Block Island, R. I., 19; Fort Canby, Wash., 18; Point Reyes Light, Cal., 18.

Monthly ranges.—The extreme monthly ranges, as computed for each Weather Bureau station from the data given in Table I, show that monthly ranges of 70°, or more, occurred in Kansas, Missouri, Nebraska, Iowa, Minnesota, North Dakota, South Dakota, and Montana.

Largest monthly ranges.—Huron, S. Dak., 85; Sioux City, Iowa, 82; Valentine, Nebr., 81; Omaha, Nebr., 80; Havre, Mont., and Columbia, Mo., 79; St. Paul, Minn., 78.

Smallest monthly ranges.—Tatoosh Island, Wash., 21; Key West, Fla., 22; Port Angeles, Wash., 25; San Francisco, Cal., and Neah Bay, Wash., 29.

DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in Table V for all stations having self-registers.

LIMITS OF FREEZING TEMPERATURE.

The southern limit of the region within which the air has had a freezing temperature at some time during the month is approximately shown by the full and dotted lines on Chart V, joining the places at which the minimum temperatures of 32 and 40, respectively, occurred within the instrument shelters of the Weather Bureau; the latter minimum is usually accompanied by a more or less severe frost on the ground outside of shelter. During March, 1894, the line of minimum 40 crossed the peninsula of Florida just south of Titusville and Tampa, and does not reappear in Texas or California. The line of minimum 32 passes from Charleston, S. C., to Jacksonville, Fla., thence westward through New Orleans, La., into southwestern Texas; it reappears east of Yuma, Ariz., traverses the central part of California and the coast line from San Francisco, Cal., to Vancouver Island.

ACCUMULATED TEMPERATURES.

From January 1 to the end of the current month the average temperature for each geographical district was above or below the normal by amounts that are given by adding together the departures, as given in Table I in heavy faced type for the respective months. The average departure is then found by dividing these sums by the proper number of months. If this average departure were added to the normal temperature and multiplied by the number of days, it would give the accumulated temperature, as that term is used by phænologists. If, however, we confine our attention to the average departures from normal values, we obtain an equally plausible basis for the comparison of temperatures and crops.

In regions where the accumulated temperature has been deficient, the average deficit for the period was as follows: Northern slope, 1.0; southern slope (Abilene, Tex.), 0.3; southern plateau, 3.3; middle plateau, 1.6; north Pacific coast, 1.3; middle Pacific coast, 2.7; southern Pacific coast, 3.1.

In regions where the accumulated temperature was in excess, the average excess for the period was as follows: New England, 1.8; middle Atlantic coast, 3.0; south Atlantic coast, 2.5; Key West, Fla., 0.8; east Gulf States, 1.3; west Gulf States, 0.7; Ohio Valley and Tennessee, 3.0; lower Lake region, 4.0; upper Lake region, 4.6; North Dakota, 2.3; upper Mississippi Valley, 3.3; Missouri Valley, 2.3; middle slope, 0.2; and northern plateau, 0.5.

PERIODS OF HIGH TEMPERATURE.

The maximum temperatures of the month occurred on dates and at stations that may be grouped as follows: On the 12th, in Colorado, extending thence southeastward, on the 13th and 14th, into Texas; on the 16th, in eastern Montana, North Dakota, South Dakota, and Nebraska, extending eastward on the 17th over southern Minnesota, Wisconsin, Iowa, Kansas, and northern Illinois; on the 18th, further eastward over lakes Michigan, Huron, Erie, and Ontario; and, finally, on the 19th, over northern New England. On the 20th and 21st, while low area No. XIV was moving from Kansas northeastward into the Lake region, the highest maxima of the month occurred in eastern Missouri, southern Illinois, Indiana, Ohio, eastern Arkansas, western Tennessee, Kentucky, and West Virginia, and on the 22d, when this area was central in the Lake region, the principal maximum temperatures of the month occurred throughout the middle and south Atlantic States.

PERIODS OF LOW TEMPERATURE.

The lowest temperatures of the month occurred at the highest stations in the early part of the month, but for all lower stations east of the Rocky Mountains they occurred in connection with the great cold wave of the 25–28th. Thus, on the 25th, the lowest minima of the month occurred in Minnesota, South Dakota, Nebraska, western Kansas, northern Missouri, and Iowa; on the 26th the monthly extremes occurred in northern Texas, southern Missouri, Arkansas, western Louisiana, the coast of Texas, Indiana, and Michigan; on the 27th the lowest temperatures of the month occurred throughout Florida, the east Gulf, south Atlantic, middle Atlantic, and New England States.

In connection with this sudden change from warm to cold weather, Chart No. VII of this REVIEW was prepared by Mr. James Berry, in charge of the Division of State Weather Services, and shows the departures from the normal of the average temperature for the seven days, from March 25 to 31.

In connection with this cold period a special bulletin was issued on March 26, from which the following extract is taken:

The period of extremely warm weather, noted in the special bulletin issued by the Weather Bureau on the 23d instant, has been followed on Sunday and this morning by one of extreme cold, which extends over almost the entire country east of the Rocky Mountains, minimum temperatures of freezing and below being reported this morning over all this region, except on the immediate coast of the south Atlantic and Gulf States and in Florida. Throughout northern Minnesota and the Dakotas the temperature this morning was below zero. In northern Georgia, eastern Tennessee, Louisiana, Texas, Arkansas, and southern Missouri, the weather is the coldest of which the Service has record for this season of the year.

Following are some minimum temperatures reported this morning from this region, with the number of degrees below the lowest previously recorded during the third decade of any March, viz: Palestine, Tex., 28, 3; Corpus Christi, Tex., 38, 4; Fort Smith, Ark., 20, 8; Little Rock, Ark., 24, 3; San Antonio, Tex., 32, 3; Springfield, Mo., 12, 1. The following temperatures are as low as any before recorded during this period, viz: Montgomery, Ala., 26; New Orleans, La., 36; Galveston, Tex., 38; Atlanta, Ga., and Chattanooga, Tenn., 20.

General frosts occurred Monday morning throughout the Gulf States and the middle and northern portions of the south Atlantic States, and the temperature will probably fall still lower on Tuesday morning in the middle and south Atlantic States, with frosts as far south as northern Florida.

AREAS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of 20°, or more, in temperature in twenty-four hours is not called a cold wave by the Weather Bureau unless the temperature falls below 40°, and is, therefore, likely to cause a frost injurious to vegetation, but all falls of 20° are indicated on the Daily Weather Map by inclosing the areas within which they occur by heavy dotted lines, and the following list enumerates these regions for the month of March. An approximate idea of the size of the area covered is given by stating in miles the lengths of the two principal dimensions when these can be given; one of these is necessarily omitted when the area extends beyond the region covered by the Weather Maps.

(A) 1st, a. m., 200 by 200 miles in Saskatchewan.

(B) 2d, a. m., 200 by 300 miles in Alberta; p. m., 600 by 800 miles in Saskatchewan. 3d, a. m., 800 by 300 miles in Montana, Assiniboia, and Saskatchewan; p. m., 500 by 250 miles in North Dakota and South Dakota.

(C) 4th, p. m., 100 by 500 miles in New Mexico, and 400 by 500 miles in North Dakota and South Dakota. 5th, a. m., 900 by 200 miles, northern Texas, Kansas, Nebraska, and southern Minnesota; p. m., 200 by 700 miles, Kansas to Minnesota. 6th, a. m., 1,500 by 200 miles, eastern Kansas, eastern Iowa, Wisconsin, northern Minnesota, and Manitoba; p. m., 150 by 250 miles, lakes Ontario and Erie. 7th, a. m., 1,000 by 200 miles, Tennessee, Kentucky, Indiana, Ohio, and Lake Huron; p. m., 200 by 200 miles, western New York.

(D) 10th, a. m., 900 by 200 miles, northern Nevada, southern Idaho, Wyoming, and northern Utah; p. m., 700 by 200 miles, northern Colorado, Nebraska, and western Iowa. 11th, a. m., 600 by 200 miles, eastern Colorado, Kansas, and Missouri.

(E) 12th, a. m., 200 by 100 miles, West Virginia.

(F) 14th, a. m., 400 by 400 miles, north of lakes Superior and Huron.

(G) 17th, a. m., 400 by 200 miles, northern Nevada and Utah; p. m., 400 by 200 miles, western part of North Dakota and South Dakota. 18th, p. m., 400 by 200 miles, New Mexico, and 800 by 300 miles, Kansas, Iowa, and Wisconsin. 19th, a. m., 300 by 300 miles, Wisconsin and Michigan; p. m., 100 by 100 miles, Lake Michigan, and 600 by 200 miles, New York, lakes Erie, Ontario, and Huron. 20th, a. m., 300 by 200 miles, northern New York.

(H) 20th, a. m., 200 by 200 miles, Alberta; p. m., 500 by 200 miles, Wyoming, Colorado, and New Mexico. 21st, a. m., 600 by 150 miles, South Dakota, Nebraska, and Colorado, and 100 by 100 miles, Manitoba; p. m., 700 by 250 miles, Nebraska, Kansas, and northern Texas. 22d, a. m., 700 by 250 miles, Iowa, Missouri, Kansas, and Indian Territory; p. m., 1,200 by 400 miles, Lake Ontario, Indiana, Illinois, Iowa, Missouri, Arkansas, Louisiana, and eastern Texas. 23d, a. m., 700 by 200 miles, Indiana, Kentucky, Tennessee, and northern Mississippi; p. m., eastern Tennessee, Virginia, western Maryland, and Pennsylvania. 24th, a. m., 600 by 200 miles, northern Georgia, South Carolina, North Carolina, and Virginia.

(I) 23d, p. m., 500 by —— miles, Montana, Assiniboia, Saskatchewan, and Alberta. 24th, a. m., 700 by 700 miles, Montana, North Dakota, Manitoba, and Assiniboia; p. m., 1,200 by 500 miles, Colorado, Kansas, Iowa, Nebraska, Minnesota, South Dakota, North Dakota, and Manitoba. 25th, a. m., 800 by 300 miles, Missouri, Illinois, and lakes Michigan and Superior; p. m., 900 by 250 miles, Arkansas, Tennessee, Kentucky, southern Indiana, Ohio, West Virginia, western Pennsylvania, and western New York. 26th, a. m., 500 by 500 miles, Alabama, Georgia, northern Florida, South Carolina, western North Carolina, and western Virginia; p. m., 100 by 100 miles in southern Florida. In connection with the cold weather of the 26th, see the section on "Temperature as affecting agriculture."

(J) 27th, p. m., 200 by 500 miles, western Montana and Alberta. 28th, a. m., 800 by 250 miles, western Montana and Wyoming; p. m., 900 by 400 miles, Colorado, Nebraska, Kansas, New Mexico, and western Texas. 29th, a. m., 400 by 300 miles, New Mexico and Texas, and 300 by 100 miles, Missouri.

(K) 30th, p. m., 300 by 100 miles, Assiniboia.

FROSTS.

The frosts that occurred in March partook of the nature of cold waves and freezing temperatures, and will be mentioned in the section on "Temperature as affecting agriculture."

COLD WAVES.

A general account of areas of 20° fall of temperature has already been given, and additional notes will be found under sections on "High areas" and "Local storms."

TEMPERATURE AS AFFECTING AGRICULTURE.

The following records of cold and warm periods are taken from newspaper summaries and the official reports of the State Weather Services:

Arkansas.—The month was abnormally warm up to the 22d, when the temperature began to decline, reaching its minimum on the 25th, 26th, and 27th in the various parts of the State. The high temperature during the first twenty days of the month had been highly favorable for the rapid growth of vegetation; gardens were well advanced, and peach and plum trees in full bloom; wheat and oats had started growing nicely; much corn had been planted, and some of it was up. On the 25th the temperature dropped suddenly, and freezing temperatures were reported generally during the four succeeding nights; ice formed to a thickness of two or three inches on water exposed in tubs and barrels. In consequence, about all the peaches and plums were killed, gardens ruined, wheat and oats damaged, and much corn so injured as to necessitate replanting. The late apples were not materially injured, and a light crop of pears will be gathered. Strawberries were set back from two to three weeks. This very cold weather, following so closely upon the excessive precipitation of the middle of the month, placed farmers very much behind with their work.

Arizona.—At Globe, 21st, apricot crop destroyed and peach crop injured to some extent. Signal, 5th, and St. Helena Ranch, 18th, 19th, and 20th, about 60 per cent of the apricot buds killed; no other fruit injured. Eagle Pass, 6th and 18th, apricots and almonds killed on the Gila.

California.—Lemoore, 21st, heavy frost, injuring fruit. Niles: heavy frost, killing potatoes, almonds, and apricots.

Delaware.—Milford, 26–29th, cold wave damaged peaches.

District of Columbia.—Washington: fruit buds and magnolia flowers killed by heavy frost.

Florida.—27th–31st, some damage to crops and fruits in the western and northern counties was done by the frosts and freezing weather.

Georgia.—27–29th, Adairsville, Athens, Brag, Camilla, Cohutta, Covington, Fleming, Hawkinsville, Leverett, Marshallville, Morgan, Rome, Point Peter, Pelham, Fort Valley, Thomasville, Clifton, and Griffin: frost killed fruit, vegetables, and wheat. Augusta: minimum temperature of the 27th was 25°, or the lowest of this winter; on the 28th another heavy frost, all tender vegetation and fruit were killed. Savannah: estimated damage in immediate vicinity, $100,000, but the warnings issued by the Weather Bureau were the means of saving at least $20,000; many of the gardeners began covering their crops on Friday, 23d, while the cold wave was still in the distant northwest. A rice planter, thanking the observer for forecasting the frost, said: "I saved my rice by opening my dams and flooding my fields with water." The previous severe frost in March, at Savannah, was March 16, 1890, minimum temperature, 26°.

Illinois.—The cold wave of the 26th generally killed peaches, plums, pears, cherries, strawberries, and garden vegetables; in southern Illinois grapes and melons suffered slightly less.

Indiana.—Exceedingly fine, warm weather until the 22d, and occasional rains; vegetation advanced most remarkably; wheat in all sections was rank, and in the southern portion it began to joint in some fields; fruit buds were almost ready to open, and in the southern and central portions oats and clover sown early had come up, when, after the 23d, the temperature fell suddenly to below freezing several nights, and much injury was done to some crops. Wheat apparently was hurt in many fields, but most so in the southern portion, where it had jointed; clover and oats in the central and southern portions were frozen, but in the northern portion, where they had not advanced so much and were covered by snow, the injury is probably less; early planted potatoes froze in the ground and tobacco had to be replanted. There is no doubt that all early varieties of fruit were injured more or less; peaches had already been totally injured in January and February, but most cherries, pears, early apples, and some berries will yield probably a poor crop, or none at all; grapes and late apples are probably all sound. Most of the clover and oats have to be replanted, but wheat is turning to its natural color, with warmer and more favorable weather.

Iowa.—College Springs: first part of the month fine weather; farmers sowing grain, making gardens, and planting potatoes, but on the 26th the thermometer registered zero Fahr., which was not the best condition for oats one inch high; it is hard to tell how much will have to be replanted; do not think fruit buds were far enough advanced to be injured much by the frost. Ovid: first three weeks of March the warmest ever known here; soft maple in bloom on the 13th, elms on the 16th; oats nearly all sown before the 24th; potatoes planted and gardens made, but the freezing weather of the past week spoiled it all.

Kansas.—The warm temperature of the first part of the month, ending on the 23d, started the early blossoms of cherries, plums, and apricots, so that the cold temperature which followed seriously injured, if not entirely destroyed, them.

Kentucky.—March was phenomenal for the great heat during the first two decades; vegetation developed rapidly, only to be stunted and even killed by the severe cold wave which followed.

Louisiana.—25–30th, the freezing weather was most injurious in the northern portion of the State, and the damage decreased going southward until near the coast line, where only the most tender vegetation was affected. Fruit suffered most severely; corn, Irish potatoes, garden truck, and tender vegetation of all descriptions sustained marked injury, and were cut down in the northern parishes, partially so in the middle parishes, and less markedly further south. Considerable replanting will be done, and this work has probably commenced wherever necessary. None or but little cotton had been planted at the close of March, and there is, therefore, no setback as far as this staple is concerned. Cane sustained but little injury from the cold and will soon recover.

Maryland.—Charlotte Hall, 25–26th, cold weather injured fruit bulbs.

Massachusetts.—Taunton: the freeze of the 27–30th damaged the buds on trees.

Michigan.—During the warm weather that prevailed previous to the 25th of March fruit buds developed to some considerable extent, and grave fears were felt that the cold wave of that date would work great harm if not ruin to the crop. A large number of letters have been received from fruit specialists since April 1, but at the time they were written the growers themselves were not entirely satisfied as to the amount of damage. The Grand River Valley Horticultural Society, March 27, believed no harm had been done, but one of its members a few days later found pears and peaches badly injured. At Ionis the growers think their crop injured but a trifle. A St. Joseph correspondent thinks peaches are all killed. At South Haven a fair crop of all kinds of fruit is expected. In Washtenaw peach buds had started to bloom, in some cases showing color; all such on low grounds are killed, while those on higher ground are not injured; apples and other fruits on high lands have escaped. A fair conclusion from these letters is that the early and tender varieties of fruit, especially peaches and pears, have been injured, but the later and hardier kinds are yet safe. This is particularly true of apples. There is no reason why a full crop of this fruit should not be expected.

Mississippi.—The close of March found farming operations about as well advanced as the average season. The cold spell of the 25–30th arriving at this critical period proved very disastrous; corn was cut to the ground and much replanting will be necessary. Fortunately very little cotton had been planted, for this was killed; spring oats were seriously retarded; peaches, pears, plums, pecans, grapes, and the first crop of strawberries are thought to be killed, even to the coast; apples and figs, though seriously affected, have survived. As an indication of the severity of the cold it is worthy of note that hickory nuts, acorns, and young fruit trees are thought to be killed in the northern portions of the State. Early vegetables, where unprotected, were completely destroyed, and the loss to truck growers was very considerable. Although the frost predictions of the Weather Bureau furnished ample warning of the approach of the cold, it was not practicable to protect the tender plants against the effects of the cold weather for such a protracted period. This sudden and severe cold spell has thrown farming operations some ten or fifteen days late.

Missouri.—From the opening of the month until the 22d the weather was unusually warm and favorable for farm work, and it was vigorously pushed; the greater portion of the oat crop was sown, gardens were made, potatoes planted, and considerable ground broken for corn; by the 22d many fields of oats were up, early gardens were making rapid growth, and the early varieties of fruit trees were nearly in bloom. The cold wave (26–30th) proved the most destructive that has visited this State for a number of years. In the southeast section the temperature fell 12° to 20° below freezing, and 20° to 30° below in other sections, the lowest temperature recorded being but 2° above zero. Oats and young clover were killed; wheat was seriously injured; garden plants that were up were killed; potatoes were frozen in the ground, and fruit was greatly injured, and in many sections all except the late varieties were entirely killed.

Nebraska.—March practically closed a very short and open winter in this State. The latter part of the month was windy and disagreeable, and fruits, especially peaches, suffered great injury from frosts and sudden freezes.

New England.—The cold wave (25–26th) caused comparatively little damage in New England. In the extreme north the ground is still covered with snow, and in the central districts the buds had made very little start. In the south no field or garden crops were advanced far enough to be injured, and although at first it was thought that much damage had been done to fruit, reports from well-known fruit growers show that the fears were groundless, and peaches only are injured, and those but slightly.

New York.—25–27th, the frosts are reported to have almost entirely destroyed the vineyard industry of the northern part of Chautauqua.

North Carolina.—The frosts of the 26–29th destroyed early vegetables, fruits, peaches, and berries, and injured corn, wheat, clover, and other grains at 18 stations from which reports have been received.

Ohio.—The cold weather of 26–28th is reported to have killed all early fruits and greatly injured wheat and oats, and the later fruits at numerous stations in this State.

Oklahoma and Indian Territory—Lehigh: The warm weather during the first three weeks brought on vegetation at an unprecedented rate, fruit trees

all blossomed and many leaved out, grapes budded, early vegetables all up, and then the four days of hard freeze, 25th to 29th, utterly destroyed all new leaves and nearly all fruit buds, though at this date, April 1, some peaches seem to show life; strawberries checked in growth, but not killed; oats damaged some. Pond Creek: high winds, 2d, 10th, 17th, 24th, 27th, and 30th; wheat injured considerably thereby. Clifton: elm buds out on the 1st, and crocus in bloom. The first two-thirds of the month were very fine for farming, and much plowing and other work completed. From 24th to 29th, it was very cold with hard frosts, the blooms of the elm and early vegetation killed. Ponca City: peaches in bloom on the 25th; crops damaged by cold in this section. South McAlester: no storms and unusually warm during early part of the month, but uncommonly cold during the latter part of the month; not much damage done, as farmers were late in planting on account of hot weather; some fruit killed, but plenty left for a good crop. Anadarko: frosts of 26th and 27th killed all early fruit. Healdton: the frosts of 24th, 25th, and 26th, injured oats, wheat, and corn that were up, and all early vegetation.

Pennsylvania.—The extreme weather of the current month is paralleled by March, 1868, but exceeded by that of March, 1854, when the maximum temperature of 78° occurred, as compared with 76.5° on March 22, 1894. The latter was followed by the extraordinary fall of temperature to the minimum of the 27th, but the damage done to crops was not so severe as would have been the case had this fall been more rapid; however, peaches, apples, and strawberries are severely injured. In March, 1854, flowers and crops of every kind were ruined, the average temperature of the first 17 days was 50.5, and of the last 14 days, 33.8. The blizzard of March, 1888, attended a spell of cold weather, bringing the average temperature of the month down to 34.7.

South Carolina.—March opened under the most favorable conditions for farming operations. Abundant rains and snow in February had thoroughly saturated both the surface and subsoil; a few warm, dry days in the early part of the month dried the top of the softened ground making plowing easy and thorough. After the 5th the heat was steadily excessive up to the 23d, and during the latter part of this period the warmth was equal to that of the ordinary first half of June. Under the combined stimulus of heat and moisture the buds on fruit trees swelled and bloomed; forest trees put out their leaves; wild and cultivated berries advanced in growth with wonderful rapidity; grapes were three weeks in advance of their season; gardens were planted earlier than usual, and made exceedingly rapid growth; all grains made a thick, luxuriant stand; in short, gardens and fields, orchards and forests, flowers and grasses, shrubbery and fruit trees had the appearance usual in the middle of April. After the freeze and frosts of the 27–30th wheat and oats turned yellow, and that of the rankest growth fell to the ground; the leaves of fruit and forest trees turned black, withered, and shriveled; gardens and tender grasses all were as if scathed by fire; corn cut down level with the ground. Some late fruit may have escaped; berries have yet time to rebud where the vines and stalks are not killed; gardens and corn can be replanted; yet, making all allowances, the loss was enormous in the two items of fruit destroyed and the cost of seeds for replanting. It is thought that much ornamental shrubbery and many trees of all varieties, as well as grapevines, blackberries, and other bushes, etc., are killed. The full extent of the damage to grains can not be known until maturity and thrashing begins and the effect on the berry can be noted. The damage was not confined to part of the State but extended from the mountains to the coast. The northwestern portion was coldest, but vegetation was correspondingly backward.

The Director of the South Carolina State Weather Service has summarized the reports of damage done by the cold weather of March 26, 27, and 28, received by him from 106 stations fairly distributed over the 35 counties of that State, and from his tabular presentation of these reports the editor has prepared the following abstract:

Apricots and peaches; 89 reports. Totally destroyed, 84; partially, 5.
Figs and pears; 87 reports. Totally destroyed, 80; partially, 7.
Pomegranates and plums; 84 reports. Totally destroyed, 77; partially, 6.
Apples; 81 reports. Totally destroyed, 51; partially, 27.
Raspberries, strawberries, and blackberries; 77 reports. Totally destroyed, 66; partially, 11.
Rye and wheat; 45 reports. Totally destroyed, 2; partially, 38.
Oats; 53 reports. Totally destroyed, 1; partially, 46.
Corn; 47 reports. Totally destroyed, 21; partially, 25.
Melons, potatoes, cabbage, and garden truck; 92 reports. Totally destroyed, 84; partially, 8.
Grapes; 89 reports. Totally destroyed, 89.

South Dakota.—The season opened unusually early. The first and second decades of March were unusually warm, and more or less plowing and seeding was done in all portions of the State. The last decade was stormy and very cold, stopping all field work until about the first of April. There was some loss of cattle, but, it appears, not near as great as was at first reported.

Tennessee.—Unusually high temperature prevailed during the first three weeks of the month, when the daily means averaged about 12° above the normal. As a natural consequence of this abnormally warm weather, general farm work advanced rapidly and vegetation was much in advance of the normal. This warm period was followed by the most severe cold wave of the month, which reduced the temperature to considerably below the freezing point. Up to the 23d of the month farmers were fully two weeks in advance of last season, and crops of all kinds were in excellent condition, except peaches, which were badly injured in some localities by the cold in January. The cold wave of the 26th and 27th killed fruit, vegetables, young clover, oats, tobacco plants in some localities, and seriously damaged wheat and Irish potatoes.

Utah.—Vegetation did not advance much in March, and the spring may fairly be called a backward one.

Virginia.—During the cold wave of the 26th to 28th the temperature was generally lower than ever previously recorded for the time of year, and following the protracted and unusual warm weather, caused very great damage to all growing crops and destroyed nearly all early fruit and tender vegetation.

West Virginia.—The following is a résumé of 100 reports from the 44 principal agricultural counties: Up to and including the 24th the conditions were markedly favorable to the growth of all forms of vegetation, and farming operations were pushed accordingly. This abnormal state of temperature was followed on the 25th by conditions decidedly the reverse. * * * A hard freeze on the morning of the 26th, a hoar frost on the 27th, and a killing frost on the 28th proved very destructive to all forms of vegetation, in many instances being almost fatal as far as a future crop was concerned. * * * Owing to the rather open winter wheat was not as well protected by snow as generally, but some is up and looking fairly well. Clover and grass had started nicely, but much damage was done by the freeze and frosts. Some wheat and oats were also frozen. In some localities the fall of snow that accompanied the freeze protected the wheat and oats to a very great extent. Garden truck was doing nicely until the 26th; early planted potatoes and onions were badly injured by the cold, and gardens generally will be affected; apples, pears, peaches, plums, cherries, quinces, and grapes were all injured; in some districts peaches, cherries, and early apples were killed outright. Plowing and preparing ground for corn is well along, but was retarded somewhat by the recent cold snap, owing to the fact that the ground was frozen.

Wisconsin.—The month of March was one of high temperatures for the first eighteen days, and of temperatures at or below the normal for the balance. Except in the northern counties the ground has been without snow covering during the month, and while winter grains were exposed to the severe frosts of the latter part of the month it is thought that no serious damage has resulted; clover, however, is probably injured in some counties.

PRECIPITATION.

[*In inches and hundredths.*]

The distribution of precipitation over the United States and Canada for March, 1894, as determined by reports from about 2,000 stations, is exhibited on Chart III. In Tables I, II, and III, the total precipitation is given for each station; the departures from the normal are given for regular stations of the Weather Bureau in Table I. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above. The average departure for each State is given in the chapter of reports from the State Weather Services.

NORMAL PRECIPITATION.

The normal precipitation for the month of March is less than 1.00 over the Rocky Mountain and plateau regions and has a maximum of 8.00 over the higher portions of the Sierra Nevada range and on the immediate coast of Washington and Oregon, but diminishes rapidly as we proceed eastward to the summit of the Rocky Mountains. A normal of from 6.00 to 8.00 prevails over the Gulf States east of Texas and northward along the Appalachian range to southwestern Virginia. From 4.00 to 6.00 occur on the immediate Atlantic coast of the Middle and Eastern States.

PRECIPITATION FOR MARCH, 1894.

The total precipitation for March, 1894, exceeded 10.00 on the immediate coast of Oregon and Washington, and dimin-